Amendments to the Drawings

The attached sheets of drawings include changes to Figs. 2A and 2B. Applicants respectfully request that Figs. 2A and 2B be replaced with the corrected Figs. 2A and 2B enclosed herewith. Applicant has submitted corrected formal drawings. Applicant respectfully requests that the Examiner approve the correction.

REMARKS

Summary

Claims 1-55 and 75-76 were pending. Claims 26-27 have been rewritten. No new matter has been added as a result of this amendment.

Objection to Drawings

In the Office Action, the Examiner objected to Figs. 2A and 2B as having reference numbers directed to the wrong components. Applicants herein supply formal replacements of Figs. 2A and 2B and respectfully request that the Examiner withdraw the objection in the next Office Action.

Objection to Claims

The Examiner objected to Claims 26-27 for informalities. Applicants have corrected the informalities and respectfully request that the Examiner withdraw the objection in the next Office Action.

Rejection of Claims

In the Office Action, Claims 1-6, 8, 10-11, 13, 15-16, 18, 20-32, 34, 36-37, 39, 41-45, 47-55 and 75-76 were rejected under 35 U.S.C. §103(a) as being unpatentable over DeTemple (U.S. Patent 6,016,027) in view of Yamamoto (U.S. Patent 5,691,608), Claims 7, 9, 12, 14, 19, 33, 35, 38, 40, and 46 were rejected under 35 U.S.C. §103(a) as being unpatentable over DeTemple in view of Yamamoto further in view of Ray (U.S. Patent 6,147,349). Claims 17 and 44 were objected to as being dependent on a rejected base claim but the Examiner indicated they would be allowable if rewritten in an independent form including all of the limitations of the base claim and any intervening claims. Applicants traverse the rejections and submit that a *prima facie* case of obviousness has not been made.

Claim 1 recites a microdischarge device. As indicated on the first page of the specification, a microdischarge device is a device that contains a gas in a cavity. When the appropriate voltage imposed between a cathode and anode, a discharge of the gas is ignited in the cavity.

DeTemple teaches a microdischarge device in which a gas is excited. Yamamoto does not. The device described in Yamamoto has nothing to do with a discharge device as defined by the specification. It merely emits electrons, which are eventually deflected towards a screen containing phosphorus, rather than exciting a gas. Moreover, the electron emitter of Yamamoto cannot be modified to include a gas (it instead contains a vacuum), at least as this would reduce the number of electrons impinging upon the screen as well as reducing the ability of the device to reproduce halftones, of primary importance to Yamamoto.

This is especially true as, in Yamamoto, once the electrons are ejected into the vacuum, they are not multiplied. The device of Yamamoto uses only the number of electrons produced by the buried p-n junction and emitted from the surface of the device away from the buried p-n junction. A microdischarge device such as DeTemple's, however, cannot function using only the number of electrons emitted by the p-n junction -- they must be multiplied by the gas. For example, electrons in the device of Claim 1 are produced by both the walls and the gas, unlike that of Yamamoto.

Although the Examiner indicated that "the efficiency of the emitting electrons exiting the discharge device" is improved, it is unclear exactly to what is being referred as electrons do not have an "efficiency." If the Examiner means that the recesses in Yamamoto improve the efficiency of extracting the electrons from the individual emitters, Yamamoto makes no such claim nor is any such result apparent. In fact, neither the shape of the cavity nor the effect of altering the shape of the cavity is mentioned by Yamamoto. Rather, the sole purpose of the cavity is to provide a window for electrons emitted by the semiconductor to gain access to the outside. Additionally, the Examiner indicated that luminance and brightness of DeTemple's device is improved by altering the shape. Again, Yamamoto makes no such claim and, how the Examiner reaches this conclusion is unclear as it is unlikely that such an effect actually occurs in Yamamoto's device. Accordingly, there is no teaching in Yamamoto why any particular shape should be chosen. Nor is motivation provided by Yamamoto to alter the shape of cavities in an entirely different device, such as DeTemple's, that operates on different principles.

Again, merely because both DeTemple's device and Yamamoto's device emit electrons is not enough to equate them -- at least because they operate on

completely different principles. Even though both devices emit electrons to excite a secondary material, they do so in an entirely different manner, solving entirely different problems and are not analogous. Moreover, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. This logic, taken even further, permits DeTemple's microdischarge device to be combined with the elements of any device that emits electrons, such as any electron microscope, CRT device, semiconductor emission device, or even a Van De Graff generator.

Also, in the Examiner's response, the Examiner indicates that the function of the instant application is the same as DeTemple's device and Yamamoto's device: to generate a desired image. However, using this to equate the two devices is incongruous as many devices are used to generate an image (such as the electron microscopes above, MRI arrangements, etc...). Further, DeTemple's device, like these other devices, has large differences from Yamamoto's device. For example, DeTemple's device generates light locally, with a light spot defined by the aperture of the cavity. Yamamoto's device transports electrons a long distance to the phosphor screen. The light in Yamamoto's device is dependent not on the cavity aperture, but on the size and nature of the phosphor and electric field in the vacuum controlling the direction of the electron beam. These differences illustrate that DeTemple's and Yamamoto's devices cannot be combined merely because they generate light in some aspect.

Furthermore, not only do DeTemple's and Yamamoto's devices operate in wholly different manners, but as stated in the response to the previous office action, the devices cannot be combined as the combination would change the principles of operation of each of the devices. The Examiner states that the only modification to DeTemple's device is using the shape of the cavity in Yamamoto's device. However, this ignores the fact that the reliance upon Yamamoto is clearly a piecemeal rejection based on collecting together elements from disparate references describing entirely different devices. Nor has any actual motivation been provided by Yamamoto -- the only motivation is provided by the instant specification.

In short, equating a microdischarge device containing a gas and in which the shape of the cavity determines, at least in part, the discharge properties, with a vacuum CRT electron emitter that has a window merely to permit electrons to escape towards a screen is unjustified. A piecemeal rejection has been created from

different, non-analogous devices, nor has any proper motivation been provided for the combination.

A *prima facie* case of obviousness has not been made out. Thus, Claim 1 is patentable over the cited references.

In addition, Claim 5 was rejected over Fig. 1A, col. 4, lines 7-21 of DeTemple. However, Claim 5 recites that the first layer, the intermediate layer and the second layer form a diode, and the intermediate layer is a depletion region of the diode. DeTemple does not anticipate or suggest such an arrangement. The structure of DeTemple is a first layer placed on a second layer with a dielectric in between. A diode cannot be fabricated by merely placing materials in contact with each other – it must be formed, for instance, using a continuous semiconductor crystal in which an abrupt change in doping type occurs. In a diode structure, a depletion region is formed from a region of the semiconductor depleted of charge and a current is permitted to flow through the device essentially in one direction.

The paragraph indicated by the Examiner states that a dielectric such as silicon oxide, glass or silicon nitride is placed between a semiconductor and conductor. Such a structure is not a diode at least as the dielectric is an insulator not a depletion region; no current flows through the dielectric (or the overall structure). Accordingly, the diode of Claim 5 is not disclosed by DeTemple, and thus Claim 5 is independently patentable over the cited references.

Furthermore, Ray teaches a device that is completely contrary to that of DeTemple's device. Ray teaches a photodetector, which absorbs light and generates current, not an emission device that emits electrons. This is absolutely, completely opposite to any of the other devices. Ray's device cannot "improve the efficiency of the emitting electrons exciting the device as well as improves the luminescence and brightness of the device" as stated by the Examiner at least as no light is generated by the device.

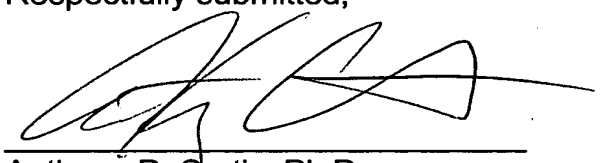
In addition, the taper described by Ray is not "at least 20 degrees and at most 60 degrees." Throughout the specification, the only times the angle of the taper is described, Ray describes it only as "about 20 degrees."

For at least these reasons, Claims 7, 9, 12, 14, 19, 33, 35, 38, 40, and 46 are independently patentable over the cited references.

Conclusion

In view of the amendments and arguments above, Applicants respectfully submit that all of the pending claims are in condition for allowance and seek an allowance thereof. If for any reason the Examiner is unable to allow the application in the next Office Action and believes that a telephone interview would be helpful to resolve any remaining issues, he is respectfully requested to contact the undersigned.

Respectfully submitted,



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